

# Claims

[c1] What is claimed is:

1. A method for a wireless receiver capable of handling signals of different modes by a common ADC, comprising  
receiving a transmitted radio frequency(RF) signal;  
down-converting the transmitted RF signal into a baseband signal;  
analog-to-digital converting the baseband signal into a primary digital signal with a basic data rate by the common ADC (analog-to-digital converter);  
processing the primary digital signal according to a first data rate not higher than the basic data rate to detect whether the primary digital signal with the first data rate carries information of a first predetermined mode; and  
processing the primary digital signal according to a second data rate lower than the basic data rate to down convert the basic sample rate into the second data rate and to detect whether the primary digital signal with the second data rate carries information of a second predetermined mode.

[c2] 2. The method of claim 1, further comprising a step of:

temporarily stopping processing the primary digital signal according to the second data rate when the information in the primary digital signal meets the first predetermined mode.

[c3] 3. The method of claim 1, further comprising a step of: temporarily stopping processing the primary digital signal according to the first data rate when the information in the primary digital signal meets the second predetermined mode.

[c4] 4. The method of claim 1, wherein the first data rate is the same as the basic data rate.

[c5] 5. The method of claim 1, wherein the basic data rate is an integer multiple of the first data rate.

[c6] 6. The method of claim 1, wherein the first data rate is lower than the basic data rate and the step of processing the primary digital signal according to the first data rate comprises a step of down-converting the basic data rate into the first data rate.

[c7] 7. The method of claim 1, wherein the first predetermined mode is GSM-1800 and the second predetermined mode is WCDMA.

[c8] 8. The method of claim 1, wherein the first predetermined

mined mode is OFDM mode and the second predetermined mode is DSSS/CCK mode.

- [c9] 9. The method of claim 1, wherein the basic data rate is an integer multiple of the lower between the first and second data rates.
- [c10] 10. The method of claim 1, before the steps of processing the primary digital signal, comprising a step of filtering adjacent channel interference in the primary digital signal with a basic data rate.
- [c11] 11. A wireless receiver capable of handling signals of different modes, comprising:  
an antenna for receiving transmitted radio frequency(RF) signal;  
an RF module for down-converting the transmitted RF signal into a baseband signal;  
a common ADC (analog-to-digital converter) for analog-to-digital converting the baseband signal into a primary digital signal with a basic data rate;  
a first baseband processing module for processing the primary digital signal according to a first data rate not higher than the basic data rate to detect whether the primary digital signal with the first data rate carries information meeting a first predetermined mode; and  
a second baseband processing module comprising:

a sample rate converter for down-converting the basic data rate into a second data rate lower than the basic data rate; and

a baseband processor for processing the primary digital signal with the second data rate to detect whether the primary digital signal with the second data rate carries information meeting a second predetermined mode.

[c12] 12. The wireless receiver of claim 11, further comprising:  
a power control module for temporarily switching one of the first and second baseband processing modules into a power saving mode when the other of the first and second baseband processing modules detects that the primary digital signal carries information meeting a corresponding predetermined mode.

[c13] 13. The wireless receiver of claim 12, wherein the power control module is capable of switching all of the baseband processing modules into a full power mode when transmission procedures of a full-powered baseband processing module are completed.

[c14] 14. The wireless receiver of claim 11, wherein the basic data rate is the same as the first data rate.

[c15] 15. The wireless receiver of claim 11, wherein the basic data rate is an integer multiple of the first data rate.

- [c16] 16. The wireless receiver of claim 11, wherein the second data rate is lower than the first data rate and the first baseband processing module further comprises a sample rate converter for down-converting the basic sample rate into the first data rate.
- [c17] 17. The wireless receiver of claim 11, wherein the first predetermined mode is GSM-1800 and the second predetermined mode is WCDMA.
- [c18] 18. The wireless receiver of claim 11, wherein the first predetermined mode is OFDM mode and the second predetermined mode is DSSS/CCK mode.
- [c19] 19. The wireless receiver of claim 11, wherein the sample rate converter is a Farrow interpolator or a Decimation Filter.
- [c20] 20. The wireless receiver of claim 19, wherein each baseband processing module comprises a Farrow interpolator for time recovery.